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AUTHOR Farless, James W.; And Others
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ABSTRACT

This study measured the interrelationships among three creativity measures: student-teacher ratings of each other's performance, subtests from the Torrance Tests of Crative Thinking, and judges' ratings of student-produced classroom products. Data were obtained from 24 gifted fifth-grade boys and girls. Data analysis indicated that girls were superior to boys on most indices, the teacher and students judged artistic and academic creativity similarly, and the best predictor of classroom product fluency and elaboration was student-teacher ratings; performance on the Torrance subtests were not highly indicative of either student ratings or classroom product fluency and elaboration. (Author)

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

INDICES OF CLASSROOM CREATIVITY

James W. Farless
Sprunica Elementary School
Nashville, Indiana

William E. Roweton
Indiana State University
Terre Haute, Indiana

Richard Donham
North East Missouri State University
Kirksville, Missouri

Donald J. Wieklinski
Indiana State University
Terre Haute, Indiana

Herbert L. Spencer, Jr.
Vermilion County Mental Health Center
Danville, Illinois

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Questions of methodology, particularly criteria appropriativeness (i.e., how and what to measure), remain pivotal issues in human creativity research. Starting with the emergence of creativity experimentation within school contexts, the literature blossomed with countless varieties of scales, tasks, and testing procedures. Too typically, each study generated its own distinctive set of indices. The more popularly utilized tasks emerged from Guilford's (1967) structure-of-intellect model and the Wallach and Kogan (1965) and Getzels and Jackson (1962) studies. Yet, the most popular single battery remains the Torrance Tests of Creative Thinking (TTCT; Torrance, 1966), featuring both verbal and nonverbal components, alternate forms, and normed protocols across ages and grade levels.

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Buried in a plethora of tasks and data, arguments of criteria appropriativeness surround obvious concerns of performance predictability. How representative and predictive are TTCT of commonly occurring classroom creative behavior? Ultimately, the most utilizable tasks and indices will be directly transferable and predictive of creative performance in typical childhood behavioral contexts. That is, it is of more value to facilitate and assess an individual's linguistic or behavioral ingenuity at school, for instance, than to train him to produce substantially more unusual uses for bricks in a research laboratory. Yet, until the techniques are sophisticated enough for

more complex training goals, the traditional but simpler laboratory tasks will persist. Meanwhile, it is necessary to assess the relationship between existing laboratory tasks and still-crude indices of "natural" creative behavior.

> If researchers are unable to differentiate creativity in terms of the performances of students in nontest situations, it is possible that the differences are merely artifacts of the specific tests being used (Klausmeier et al. 1962, p. 75).

The present study approaches this question by comparing data from three types of creativity assessment procedures: (1) student and teacher rating scales of (each others') creativity classroom performance, (2) two scales from TTCT, and (3) creativity ratings of student-produced, classroom products. Each assessment procedure yielded several indices, and the present study sought to assess their inter-relationships.

Method

Ss.--Data was obtained from testing 12 fifth-grade girls and 12 fifth-grade boys from a special class for the gifted.[1] Geographically, students were from across Vigo county, attended Crawford Elementary School (Terre Haute, Indiana) daily, and were initially selected by testing the total pool of the county's fourth grade students.[2]

Procedures.--Three types of assessment procedures were utilized, generating 34 creativity indices (see Table 1)[3]: (1) student and teacher ratings (see Appendix A and Table 1); (2) the "Just Suppose" (Form B) and "Incomplete Figures" (Form B) subtests of TTCT; and (3) classroom product ratings (see Table 1). Ss were group tested.

In one testing session, both Forms A and B of the "Just Suppose" and "Incomplete Figures" subtests (of TTCT) were administered. Forms A preceded Forms B, and, for each form, verbal tests were administered prior to nonverbal tests. Only Forms B were scored. Student-teacher ratings followed the Torrance tests.

Separately, student-produced classroom products, accumulating over the last six weeks of the school year, were collected and rated by three judges over numerous fluency and elaboration indices (see Table 1). The collection of student-produced products was as exhaustive and as representative as possible, consisting of varieties of non-artistic (e.g., academic) and artistic items (e.g., constructions, drawings, graphs). Examples of unsampled performance were art murals, discussions, science demonstrations, group-made maps, and spelling tests.

Results

Data analysis indicated that, on the average, girls exceeded boys on 28 of 34 variables; eleven of the boy-girl performance differences were significant (see Table 2). Interestingly enough, of these 11 significant differences, nine, on the average, favored the girls. In brief, academically and especially in art, boys, girls, the teacher, and the class rated girls superior. Otherwise, girls' drawings were more elaborate ($t = 2.50$, $p < .05$), and they produced more compound ($t = 3.99$, $p < .01$) and simple ($t = 3.30$, $p < .01$) sentences. However, in essays, boys generated signficantly more adverbs ($t = 4.57$, $p < .01$) and complex sentences ($t = 5.41$, $p < .01$) than girls.

No other boy-girl performance differences were significant.

Selected Correlation of Indices

How do creativity ratings of classroom products, teacher-student ratings of classroom performance, and the utilized subtests of TTCT intercorrelate?

An analysis of single variable correlations indicated that class ratings on academic creativity (4)[4] correlated significantly with class ratings on artistic creativity (8) ($r = .67$, $p < .01$) and teacher ratings of academic performance (3) ($r = .47$, $p < .025$). The teacher's academic ratings (3) also related signficiantly to the girls' academic ratings (1) ($r = .45$, $p < .025$)

and the boys' academic ratings (2) (r = .44, p < .025). Furthermore, the teacher's art ratings (7) related significantly to the average class-art ratings (8) (r = .46, p < .025) and the boys' art ratings (6) (r = .57, p < .01). In brief, teachers and students judged academic and artistic creativity similarly.

Student Ratings by TTCT

The girls' academic ratings of their classmates (1) correlated significantly with nonverbal fluency (14) (r = .44, p < .025) and nonverbal flexibility (15) (r = .38, p < .05); nonverbal flexibility (15) was also significantly associated with the class' average academic ratings (4) (r = .37, p < .05).

The total TTCT nonverbal score (32) related to the girls' ratings (5) (r = .42, p < .025), the boys' ratings (6) (r = .40, p < .05), and the average class ratings on artistic creativity (8) (r = .42, p < .025). Further, both the boys' (6) and class' (8) artistic ratings correlated significantly to the TTCT grand total (36) (r = .37, p < .05, and r = .36, p < .05).

TTCT by Products

Product Fluency.--Poetic fluency (19) related significantly to TTCT verbal flexibility (10) (r = .36, p < .05) and TTCT verbal originality (11) (r = .46, p < .025). Drawing fluency (21) is significantly associated with TTCT verbal fluency (9) (r = .39, p < .05), TTCT nonverbal flexibility (15) (r = .41, p < .025), TTCT nonverbal originality (16) (r = .63, p < .01), TTCT total nonverbal score (32) (r = .35, p < .05) and TTCT grand total score (36) (r = .39, p < .05).

Product Elaboration.--The number of adjectives (26) correlated significantly with TTCT verbal fluency (9) (r = .36, p < .05), TTCT verbal flexibility (10) (r = .46, p < .025), TTCT verbal originality (11) (r = .62, p < .01), and TTCT total verbal score (13) (r = .41, p < .025). The number of

compound sentences (29) related significantly to TTCT nonverbal elaboration (17) (r = .37, p < .05); the number of simple sentences (30) related to TTCT nonverbal fluency (14) (r = .38, p < .05). Art-construction elaboration (24) was closely associated with TTCT nonverbal originality (16) (r = .42, p < .025).

Student Ratings by Products

In brief, several fluency measures, especially the number of compound and simple sentences and the number of constructions, were effective predictors of girls' and boys' ratings of academic and artistic creativity. Further, drawing elaboration correlated positively with boys', girls', and the average class art ratings (see Table 3).

Selected Multiple Correlation of Indices

Three multiple correlations were not significant: verbal fluency (9 and 18, 19); nonverbal fluency (14 with 20, 21, 22); nonverbal elaboration (17 with 23, 24). Only the fourth cluster, verbal elaboration (12 with 26, 27, 28, 29, 30), was marginally significant (r = .52, p < .10).

Summary and Discussion

Data analysis yielded a mixture of suggestive yet unsystematic evidence.

For academic and artistic creativity, girls were superior to boys across some product and rating indices; the girls' decided school advantage has been evidenced numerously, and the effect is pronounced with this study's fifth-grade group.

It is important to note that boys and girls did not perform significantly different on the "Just Suppose" and "Incomplete Figures" tests, a finding generated previously by Torrance and others (see Torrance, 1966).

The student ratings did not correlate convincingly with TTCT indices. What relationships that existed were overwhelmingly with nonverbal Torrance

measures, whether associating artistic or academic ratings. The predictive relationships seem of little salvageable consequence.

The association between TTCT and product indices were similarly unclear. Selected product fluency and elaboration measures related unsystematically to both verbal and nonverbal Torrance measures across fluency and elaboration indices. However, it is important to note that neither the Torrance nonverbal (and verbal) elaboration measures nor the nonverbal (and verbal) fluency measures related directly to the product elaboration and fluency measures, respectively. Nonetheless, nonverbal product indices associated more frequently with Torrance nonverbal measures than with Torrance verbal measures; likewise, verbal product measures were more apt to significantly correlate to other verbal than nonverbal measures.

In this study, the best predictor of classroom product fluency and elaboration is student ratings. In brief, academic and artistic student ratings related to product fluency measures, especially the number of compound and simple sentences. Interestingly enough, drawing elaboration correlated significantly to girls' academic and girls', boys', and class' artistic ratings. Judge creative-achievement seemed partially compounded with verbal facility and product complexity.

In sum, performance on the utilized Torrance subtests are not highly indicative of either student assessments or product fluency and elaboration. Torrance test performance may be largely unrepresentative of typical classroom creativity. Rather, those rated creative are not necessarily superior on Torrance's measures but are typical of fifth-grade academic achievers, i.e., verbally facile and female. Note that the students and their teacher operated upon quite similar conceptions of classroom creativity for their ratings highly related.

Yet, the effective constructs defining creativity are not the same for the Torrance subtests and representative classroom performance and peer perceptions. Obviously, through either a modification of Torrance's measures or a more sensitive analysis of classroom creativity, the predictive correspondence between short-duration creativity tests and samples of natural performance must be strengthened.

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Footnotes

1. The Crawford Elementary School program for the gifted evolved over recent years through the resourcefulness of Mrs. Geraldine Black and Mr. Herman Neckar. Aside from the present study, inquiries about the project may be directed to Mrs. Black, Rea Elementary School, 1305 North Fourth, Terre Haute, Indiana. Upon contacting Rea School, visitors will be welcomed.

2. Selected children scored high on SRA's (group-intelligence) Primary Mental Abilities test and obtained 125 IQ or higher on the Wechsler. Further, the children must score two school-grades ahead of their age-mates on the reading portion of the Iowa Test of Basic Abilities. Last, children and their parents were interviewed.

3. I am grateful to Rick Donham, Jim Farless, and Don Wleklinski for their painstaking endurance throughout the analyses of data. Also, I would like to thank Mrs. Black for her continued cooperation and for the use of her class.

4. Number in parentheses corresponds to variable designations in Table 1.

Table 1

Creativity Indices

Variable No.	Name	Additional descriptors
Ratings		
1	Academic rating of each student by girls	
2	Academic rating of each student by boys	
3	Academic rating of each student by teacher	
4	Academic rating of each student by class	Student and teacher ratings pooled
5	Art rating of each student by girls	
6	Art rating of each student by boys	
7	Art rating of each student by teacher	
8	Art rating of each student by class	Student and teacher ratings pooled
Torrance Tests of Creative Thinking		
9*	Fluency, verbal	
10*	Flexibility, verbal	
11*	Originality, verbal	
12*	Elaboration, verbal	
13*	Total verbal score	Sum variables 9 - 12
14**	Fluency, nonverbal	
15**	Flexibility, nonverbal	
16**	Originality, nonverbal	
17**	Elaboration, nonverbal	
32**	Total nonverbal score	Sum variables 14 - 17
36	Torrance Tests grand total	Sum variables 13 & 32

* Variables 9 - 13 derived from Verbal Form B, Torrance Tests of Creative Thinking, "Just Suppose."

** Variables 14 - 17 and 32 derived from Figural Form B, Torrance Tests of Creative Thinking, "Incomplete Figures."

Table 1 (cont.)

Variable no.	Name	Additional descriptors
Classroom products		
Fluency, non-art		
18	Prose	
19	Poetry	
33	Total	Sum variables 18 & 19
Fluency, art		
20	Constructions	
21	Drawing	
34	Total	Sum variables 20 & 21
22	Others	Includes graphs, tables glossaries, etc.
35	Grand total	Sum variables 33, 34 & 22
Elaboration, non-art		
26	No. adjectives	
27	No. adverbs	
28	No. complex sentences	
29	No. compound sentences	
30	No. simple sentences	
Elaboration, art		
23	Drawing	Mean no. colors
24	Construction	Mean no. colors

Table 2

Significant Boy-Girl Performance Differences

Variable no.	Name	Mean Girls	Mean Boys	t (df=22)=	p < *
1	Academic ratings by girls	4.10	3.67	2.60	.01
4	Academic ratings by class	3.98	3.67	1.77	.05
5	Art ratings by girls	3.82	3.34	2.35	.05
6	Art ratings by boys	3.72	3.12	3.00	.01
7	Art ratings by teacher	4.17	3.33	2.53	.01
8	Art ratings by class	3.77	3.22	2.83	.01
23	Colors in drawings	6.62	4.80	2.50	.05
27	No. adverbs	1.92	5.19	4.57	.01
28	No. complex sentences	3.19	9.21	5.41	.01
29	No. compound sentences	3.05	.69	3.99	.01
30	No. simple sentences	22.43	7.54	3.30	.01

*$t \geq 1.72$, df=22, $p < .05$

$t \geq 2.51$, df=22, $p < .01$

Table 3

Selected Significant Correlations Between

Student Ratings and Classroom Products

Student rating Variable (no.)	Classroom product Variable (no.)	r =	p <
Girls' academic (1)	No. constructions (20)	.38	.05
	Drawing elaboration (23)	.35	.05
	No. compound sentences (29)	.45	.025
	No. simple sentences (30)	.49	.01
Class' academic (4)	No. constructions (2)	.37	.05
	No. simple sentences (30)	.38	.05
Girls' art (5)	Drawing elaboration (23)	.41	.025
	No. compound sentences (29)	.57	.01
	No. simple sentences (30)	.53	.01
Boys' art (6)	No. poems (19)	.42	.025
	Drawing elaboration (23)	.42	.025
	No. compound sentences (29)	.64	.01
	No. simple sentences (30)	.52	.01
Class' art (8)	Drawing elaboration (23)	.42	.025
	No. compound sentences (29)	.64	.01
	No. simple sentences (30)	.54	.01

Appendix A

DIRECTIONS AND SAMPLE RATING FORMS
FOR VERBAL AND NON-VERBAL CLASSROOM CREATIVITY

We would like for you to rate each person in your class on how creative you think he is. In deciding how to rate an individual on creativity, you might want to consider the following question: Is he or she sensitive, flexible, spontaneous, original, and intuitive?

Below you will find lists of the persons in your class. Place a check beside the name under the column you feel best describes that person's creativity in that area. Place only one check beside each name.

I. In art: music, drama, painting.

	High Creativity	Above Average Creativity	Average Creativity	Below Average Creat.	Low Creat.
Susan Bell	____	____	____	____	____
Janet Cristee	____	____	____	____	____
Carl Crowe	____	____	____	____	____
Perry Donham	____	____	____	____	____
Carol Druelinger	____	____	____	____	____
Mary Fisher, etc.	____	____	____	____	____

II. In the classroom: writing, reading, social science.

	High Creativity	Above Average Creativity	Average Creativity	Below Average Creat.	Low Creat.
Susan Bell	____	____	____	____	____
Janet Cristee	____	____	____	____	____
Carl Crowe	____	____	____	____	____
Perry Donham	____	____	____	____	____
Carol Druelinger, etc.	____	____	____	____	____